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ROBINS ON MIGRATION OBSERVED AT THE TUSKAR ROCK AND LIGHTHOUSE.

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The migratory movements of this very familiar and common bird, common in Ireland as well as in England, Scotland, and Wales, seem to be puzzling. Many Robins are said to change their quarters by making overland peregrinations within the confines of the British Isles, but the increase of birds in some districts cannot be explained on those grounds. Here in Sheffield, for instance, there is a marked increase of Robins in the autumn, and although this locality is many miles removed from the sea, there is no reason whatever for thinking that the increase in birds is simply an influx of birds, already resident, from the eastern seaboard of Great Britain—in other words, a westward overland movement comparable to what is said to take place between the mainland and adjacent islands on the western seaboard of Ireland when stress of weather and consequent scarcity of food compel the birds to resort to milder climates.* Stress of weather may compel Robins, and for that matter, many other species, to seek refuge along the more genial winter climes of the western fringe of Ireland, but this factor alone cannot account for the increase of Robins in winter at such localities. As evidence bearing on this point, I may say that when I was at Clare Island, Co. Mayo, in December, 1910, the weather on the mainland and on the island was quite mild, yet Robins were much more numerous than they had been there in the spring and summer. When I lived in Dublin I always noted a decided increase of Robins in the autumn and winter, *i. e.* from October onward. It seems very likely, then, that a considerable number of Robins immigrate to Ireland as well as to Great Britain at the fall of the year. The puzzling feature is this: Why have I seen and collected so few birds during my one hundred and twenty-four days' residence at the Tuskar Light Station? In its bearing, in its movements, in its bold confiding nature, and in its plumage the Robin attracts notice. In fact, few birds ought to be less easily overlooked. And yet I observed only seven Robins altogether—six at the lantern and one on the rock, all of which I collected. Beyond one other bird observed on the rock by Mr. Granville, no other records were made of the presence of this species during my stay at the Tuskar Light-Station. I have not as yet had opportunities of learning something of the features of migration of this bird at other light-stations along the eastern seaboard of Ireland, where differences in the powers of illumination, in the speed of revolution of the rays in revolving lights, in the height of the lantern from the ground, may act as determining factors in a more or less degree in attracting this species to the lantern. Hence it is quite obvious that one cannot state with any degree of certainty that the cause of the Robin's absence from the lantern depends upon its peculiar powers of sight, so that it can withstand to a considerable extent the intense brilliancy of the rays without being dazzled, and thereby can largely avoid coming in contact with the lantern-glass. However, on the other hand, from a close study made repeatedly on many species, I can state with considerable confidence that, under the mesmeric enchantment of the luminous beams, different birds do behave very differently.

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* On the contrary, the weather in the fall of the year in Sheffield and Yorkshire generally is more severe than it is on the east coast.

In the case of the Robin, I noticed that the six specimens which approached the light acted very similarly. They came up quietly, fluttered down the glass, and were easily picked off. While under the impression that I may have seen more Robins in the rays other than those collected, I cannot at the same time feel convinced in this matter, and my hypothesis is framed almost entirely on the fact that I saw birds about the same size

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and plump build of the Robin on nights when this bird was captured, and that these birds behaved in a characteristic manner. Unlike many species which career wildly about in the rays before approaching the glass, each suspected Robin flew quietly and almost heavily towards the lantern. Unless it struck it seemed to fly back for a short distance, and then disappear by descending into the abyss of darkness. Moreover, each Robin seemed to make but one effort to reach the glass, failing which it went off with downward flight. So evident was this feature that I never had the opportunity of seeing one strike, as many birds do, in a wildly excited fashion, flutter half-way down, leave the lantern, and come back to repeat this performance, or to strike against the iron framework, the balcony railings, or other parts of the lighthouse, and thereby allow me to become familiar with the species, and soon to be able to identify it.

Not one of the six Robins was identified by me until they were brought to hand. The above considerations lead me to think that the Robin is one of those species which may not be so susceptible as some others to the dazzling influence of the luminous beams. In succeeding articles I hope to point out, in dealing with particular birds, that their behaviour at the lantern is highly characteristic. Here, however, I can only refer to two birds which, given the same meteorological conditions, behave very differently under the sway of the lantern's glare. The Starling becomes a perfect fool, and insists on flying with full—or at all events considerable—force against the glass. If it does not kill itself outright or render itself unconscious, it will, with loud clattering of feet and wings, come fluttering down the lantern. If captured and liberated, it usually comes back with great force, and, if not already incapacitated, will repeat this performance till it falls dead or exhausted on the balcony or rock. The Swallow, on the other hand, will fly for hours—even all night, and in thick, misty weather—round and round the lantern, and in and out and up and down the path of the rays, and yet avoid the glass in a most marvellous manner. To return to the aërial movements of the Robin in the vicinity of the lantern, I would say that its advent is mainly a sign of fatigue. I do not say for a moment that such is not the case in many other birds, but it appears still more evident in the case of the Robin, whose quiet approach to the lantern in its endeavour to secure a resting place appears to be but once attempted. I surmise with a considerable amount of conviction that those birds which failed to reach the glass descended to the waters below, off which they never rose again. On no occasion have I noticed Robins augment in numbers as the night grew later.* This means they did not tarry at the lantern till their companions, coming in successive parties, reinforced their numbers. But in other species no feature in bird-migration is more characteristic. On a dark, calm, and misty night we may see only one or two Willow-Warblers or Wheatears for an hour, or perhaps two, flying out in the rays, while later on these are joined by others, so that by midnight there may be double or treble the numbers. When the meterological conditions, being favourable, remained constant, I have often noticed a steady and regular increase of numbers up to a short time before dawn. Here it is evident that those birds which arrived round the lantern in the earlier part of the night, and still were able to career about till nearly dawn, must have been far from fatigued. At the same time the light seemed to possess a fascination for them, and compelled them to fly round and round the lantern with unceasing energy. In regard to the remarkable paucity of the occurrences of the Robin at the Tuskar lantern, it may be observed that while this species made its appearance on dark, calm nights and in company with other species, still it was conspicuous by its absence on many other nights when the meteorological conditions were much more conducive in attracting migrants, which, indeed, collected round the lantern in large numbers. On such nights Robins probably were also on the move, but avoided being lured to the beacon's blaze.

Coming now to my personal observations on this species made at the Tuskar Light-Station, it seems to me surprising that during a spell of thirty-two days' residence on the Rock, *viz.* from March 21st to April 22nd, I made no records of this bird's appearance during the vernal migration. In fact, I did not see a single Robin during all that time I was on the Rock. And yet the period of the spring migration is apparently a lengthened one, extending from February to May, during which months many observations elsewhere have been made, and records attested by the capture of specimens (Barrington). The time when I was at the Tuskar Light-Station last spring should have represented the period of most active migration. Furthermore, in regard to the state of the weather, I may set forth that there were several splendid nights suitable for alluring migrants to the lantern, on which occasions great numbers of birds were collected. It is interesting to note, moreover, that in the lengthened period from 1881 to 1897, Mr. Barrington* only obtained four reported occurrences from the Tuskar in the spring—three in February and one in March. It is very significant that none of these occurrences are instances of birds seen at the lantern, but on the rock and in gloomy weather. The birds were not captured, and so these occurrences cannot carry the same weight that they would, had the specimens been secured and forwarded for corroboration. In fact, from what I have to say presently, we shall see what an important matter it is for an ornithologist to receive statements regarding the occurrence of this species (familiar and conspicuous though it may be as we see it in our lawns and gardens) with a considerable degree of caution. In short, then, neither Mr. Barrington nor I have *received* a specimen of the Robin in spring from the Tuskar Light-Station. Having thus no personal experience of the Robin's migration in spring at the Tuskar Light-Station, I feel I am not in a position to offer much comment in regard to its migration route, but probably large numbers adroitly avoid the lantern. Inasmuch, however, as it has been observed at several of the lightships adjacent to the Tuskar Rock, one cannot infer that the latter station is out of its migration route. From the Blackwater Bank Lightship its occurrence has been proved, for Mr. Barrington† tells us he received a specimen from that station on March 13th, 1896.

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* In his 'Studies in Bird-Migration,' vol. i. p. 40, Mr. Eagle Clarke mentions that fifty or sixty Robins were noticed, on November 10th, flying round the lantern of the Kentish Knock Lightship from 2 a.m. till daylight. But whether a smaller number were noticed earlier in the night is not stated.

Now, if we include the east coast generally, the Robin is said to have struck the lanterns of five stations, while in the case of the north coast it only struck two, the south coast two, and the west coast only one.* However, from what I have said in regard to its behaviour at the lantern, it is evident that we cannot conclude from these statistics alone that much greater numbers pass along the east coast than along the other coasts of Ireland. It is suggestive that the Robin, like the Wren, may fly relatively low, and so pass the Tuskar tower below the level of the lantern. This, however, would not account for the complete absence of the bird from the lantern in spring and its occurrence in autumn.

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* 'Migration of Birds,' "Analysis of Reports," 1881–1897, pp. 38–42.

† *Loc. cit.* p. 38.

Passing on to the autumnal migration of the Robin, I am able to furnish seven personal records from the Tuskar Light-Station—six from the lantern and one from the rock. Five of these birds were obtained in September—two in September, 1911, and three in September, 1912. Taking the two seasons together, we find that the occurrence of the Robin in September covered only a period of six days, extending from Sept. 12th to 17th, the birds of 1912 appearing just a shade earlier than those of 1911. Hence it may be that this is a period marked by active migration, and that these birds represent stray specimens from many others which passed the lantern unobserved. But, assuming that the Robin avoids the lantern to a large extent, it is extremely hard to fix the period when migration is at its height. However, I was pleased to obtain evidence this autumn of the migration of this bird in August, in which month the other two specimens were collected. In 1911 I did not arrive on the Tuskar Rock until Sept. 11th, and hence cannot say whether the Robin occurred in August.

In regard to the specimens collected, it may be noted that the two earliest birds of the season were captured almost simultaneously, whilst the last two Robins of the season were obtained also on one night and in rapid succession. The first birds, according to season and not to year, were obtained on Aug. 15th, 1912. The night was calm, the sky dark and clouded over, and there was a light breeze coming from the west. Though I saw a few birds flitting about in the rays since 9 o'clock, nevertheless no bird came in contact with the glass before 10.40 p.m., when the Robin was captured. This bird flew in very quietly, and after a few flutters it managed to secure a footing on a window-sash above my head out of arm's reach. However, in the dazzle of the white beam as it swept across the bird, the latter came fluttering down in response to tappings made by Mr. Glanville on the pane of glass below. As the bird descended and came within reach it was easily picked off the lantern-window.

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* Barrington, *loc. cit.*, p. 39.

Half an hour passed before I saw another bird. Then at 11.10 o'clock a bird flew quietly in over my head until it came in contact with the glass, down the panes of which it started fluttering; however, being within arm's length, I easily secured it without a moment's delay. It proved to be a second Robin. Birds were scarce and species few this night, the only other species I identified being Wheatears and Spotted Flycatchers, examples of which flew against the glass, but were not collected.* At the time that the second Robin was collected the wind had veered to south-west, and the sky had cleared sufficiently to allow the stars to shine out, though not brilliantly. About midnight a few small birds, which may have been Robins, passed through the rays; odd birds of this kind appeared at intervals of about every twenty minutes till 2 a.m. From then until dawn I saw no more birds. On the whole this night was very dark and calm, and had there been more haze it would have been a typical night for bringing birds round the lantern.

An interval of twenty-eight days now took place before I saw another Robin. On Thursday night, Sept. 12th, 1912, at 10.10 o'clock, one came up slowly to the lantern just over my head, and as it fluttered down the glass I collected it. The night was calm, the sky dark and somewhat overcast, but it cleared at intervals so that the stars shone out brilliantly. Curiously enough, it was just in one of these starlit intervals that the Robin was collected. This was a night in which many kinds of birds were seen round the lantern. Wheatears, mainly belonging to the large race, appeared soon after darkness set in. They were followed by Willow-Warblers, Corn-Crakes, Goldcrests, Ring-Ouzels, Chiffchaffs, Sedge-Warblers and Common Terns. Specimens of all these were collected,

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* *Vide* "Spotted Flycatchers on Migration observed at the Tuskar Rock and Lighthouse," 'Irish Naturalist,' October, 1912, p. 198.

Corn-Crakes excepted. None of the species appeared in large numbers.

Following the order of season, regardless of the particular year, I now record the observation made by Mr. Glanville (Principal Lightkeeper). On Sept. 12th, 1911 (the same day of the month that the last-mentioned Robin appeared in 1912), he saw a Robin on the Rock at 7.40 a.m., in company with a Wren, a Goldcrest, a Whinchat, some Wheatears, and Sedge-Warblers. It was the second day of my first visit to the Rock, and, being inexperienced, I thought it would be probably an easy matter to secure these specimens if I hunted them up later on. But I found out my mistake, for, on coming out two hours later when I had finished writing my journal notes, the Robin, the Wren, and the Goldcrest were nowhere to be seen. I have since learned that birds may in some instances alight on the Rock for a few minutes, and it is a good rule to go out and look for them the moment one hears of their presence. The Sedge-Warblers and Wheatears, however, remained on, and I collected specimens of each. Later in the day I saw a Pied Wagtail, and in the evening collected a specimen of the Blue-headed Wagtail* and of the Spotted Flycatcher. On this occasion the Robin was migrating in company with several species. All these birds no doubt tarried to seek shelter on the rock, for the morning set in very wet, and the wind, at first blowing a moderate breeze, rose later in the day to a fresh, and still later to a strong, breeze. The sky also remained very overcast and gloomy-looking, and rain fell all day long.

Two days later—here again according to season and not to year, *i. e.* on Sept. 14th, 1912—I observed a Robin on the Rock at 9.30 a.m. It was tame, rather fatigued, and easily collected. This morning Meadow-Pipits and Swallows flew past the Rock; several Pipits alighted, also two Grey Wagtails and a Pied Wagtail. In addition three other Grey Wagtails passed over the Rock. The morning was fine, bright, and fairly calm, the wind an hour before noon falling off to a flat calm. The prevalent wind during the day was west. On the night of the same date, at 8.2 o'clock, I saw a bird whose plump build and quiet flight, as it drew near the lantern, suggested to me that it was a Robin. It came up to the glass, but soon it departed to return no more. It may, however, have been a Stonechat, a bird with somewhat the same form and flight. I surmise this because I observed and collected a female Stonechat at 6.10 the next morning. Wheatears, Swallows, and Greater Whitethroats appeared this night, and I collected examples of the last-named species. The night was very calm, the sky dark and overcast, the wind west, but the atmosphere was so exceptionally clear that from the balcony we could see the flash of the Blackwater Bank Lightship's lantern—a rare sight.

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* *Vide* "Birds new to Ireland," 'Irish Naturalist,' March, 1912, p. 49.

Two nights later—*viz.* Sept. 16th, 1912, at 11.35 p.m.—I collected a Robin, which came in quietly and fluttered down the lantern. Just then Chiffchaffs appeared in considerable numbers, and I collected specimens of them immediately before and after I secured the Robin. The prevalent wind was north-west. The night was dark, the sky overcast, and the weather exceedingly calm. Many kinds of birds on the move came near the lantern, though several species escaped striking. Several aquatic birds came into the rays, *e. g.* Curlews, Redshanks, Turnstones, and Terns. All these I saw and could identify; I also heard several times the voice of the Snipe, though I failed to catch a glimpse of the bird itself. Many kinds of land-birds also appeared; with the exceptions of two Song-Thrushes and a Spotted Flycatcher, seen in the rays, specimens of all the other kinds seen were collected. In addition to the Robin and Chiffchaff already mentioned, these were: The Greater Whitethroat, Ring-Ouzel, Goldcrest, and Wren. I do not think that I saw any other Robins besides the one I collected.

The latest autumnal record of the occurrence of the Robin, when two appeared simultaneously at the Tuskar Light-Station, was made the next night, Sept. 17th, but in the previous year, namely, 1911. These were really the first two Robins which I collected, but seasonally they were the latest. Their aërial movements as they drew near the lantern were similar to what was seen in the case of the other Robins. But this was the only instance in which the two birds flew against the glass exactly at the same moment, the hour being 9 p.m. Besides Wheatears and Goldcrests, specimens of which I collected, no other birds appeared which I could name. A few, however, flew about in the rays which may have been Robins. The numbers of birds round the lantern this night were not many, and their presence was of short duration. The first bird I saw was at 8 p.m., the last at 10.30 p.m. The weather was calm, the sky dark and overcast, but the atmosphere was clear, and a light breeze was blowing from the north-west.

The occurrences of the Robin, then, which took place during my residence on the Tuskar Light-Station may be summed up as follows:—

First visit, Sept. 11th to Oct. 7th, 1911.
Sept. 12th.—One Robin seen on the Rock, 7.40 a.m.
Sept. 17th.—Two Robins collected at the lantern at 9 p.m.
[A few others suspected to be Robins, seen in the rays.]
Total number of records: *three.*
Second visit, March 21st to April 22nd, 1912.
No occurrences recorded.
Third visit, July 29th to Sept. 30th, 1912.
Aug. 15th.—Two Robins collected at the lantern—the first at 10.40, the second at 11.10 p.m.
Sept. 12th.—One Robin collected at the lantern at 10.10 p.m.
Sept. 14th.—One Robin collected on the Rock at 9.30 a.m.
[Another, suspected to be a Robin, seen in the rays of the lantern at 8.2 p.m.]
Sept. 16th. — One Robin collected at the lantern at 11.35 p.m.
Total number of records: *five.*
Grand total made during one hundred and twenty-four days' residence at the Tuskar Light-Station: *eight.*

N.B.—Occurrences included in square brackets, whose identification is uncertain, are excluded from the numbers in this summarized list.

Before concluding this paper, I should like to refer to the extraordinarily small number of Robins which Mr. Barrington *actually received* during his negotiations with all the light-keepers round the Irish coast during the period of years extending from 1881 to 1897. Only two specimens were received—one in spring (killed striking the Blackwater-Bank Lightship lantern, Co. Wexford, March 13th, 1896), and one in autumn (killed striking the Rockabill Lighthouse lantern, Co.

Dublin, November 1st, 1891).* If, however, we give full credit to the statement in which it is said the bird struck on twenty other occasions,† the census of the occurrence, though still exceedingly small, affords us some testimony that the Robin is a genuine migratory bird. If we look at the reported occurrences which Mr. Barrington received, we find he gives, including spring and autumn migration, eighty during the months of regular migration, and of these forty-one are from the east coast, twenty from the west, eleven from the north, and eight from the south.‡ Crediting such as a fairly accurate return, there is, as Mr. Barrington says, "a sufficient concurrence of testimony from many stations to lead us to the conclusion that the Robin annually migrates in some numbers." § However, without the evidence obtainable from a light station at all, the noticeable increase of Robins over a wide area of the British Isles in autumn and winter can only be satisfactorily accounted for by an influx of visitants from without the British Isles. Nor do the local overland movements, directed chiefly to the islands of the western seaboard of Ireland, necessarily supplant the more protracted pilgrimages taken by the immigrants arriving on any points of the Irish coast. But what interests me greatly in reading Mr. Barrington's article on the Robin in his 'Analysis of Reports, 1881–97,' is this: that evidently not one of the twenty Robins said to have struck have been forwarded.‖ What became of them, and did the lightkeepers really secure them and identify them beyond doubt? Personally I have no reason to doubt that twice twenty Robins may have come to the lanterns, for even that number would be far smaller proportionately than what I have furnished of the birds I saw in a few months, and at only one lighthouse. One would like to know what is really meant by the term "*striking*," in the case of the above-mentioned twenty Robins, and were the birds killed, stunned, or even badly disabled, thereby attracting the lightkeepers to put them out of misery directly they were discovered? This point interests me to a great extent, because none of the birds which I collected "*struck*" in the strict sense of the term, but simply came in quietly to the lantern and then fluttered down the glass; and, had I not been on the spot to pick them off, the chances are more likely than not that they would have exhausted themselves and fallen over the balcony into the sea. If the birds, here recorded by Mr. Barrington as having "*struck*," behaved similarly, we then have an explanation offered as to why they were not forwarded; simply because they were probably never brought to hand. For, from what I can glean from lightkeepers, the common practice is not to go out on the balcony and try to capture a bird which is fluttering down the glass, unless it first shows some indication of having been disabled to a degree sufficient to ensure its capture.

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* Barrington, *loc. cit.*, p. 38.

† *Loc. cit.*, p. 39.

‡ *Loc. cit.*, p. 42.

§ *Loc. cit.*, p. 39.

‖ *Loc. cit.*, p. 39.

The lightkeepers see so many common small birds fluttering on the glass that they grow as used to the sight as we do when we behold for a moment moths fluttering at a street-lamp, and then take no further notice of these insects. This—coupled with the fact that when migrants approach the glass it is frequently raining, or at all events the weather is generally damp and foggy and uninviting for the keepers to leave the shelter of the inside of the lantern—gives the key to why so many birds are let pass. If, on the other hand, we get a number of birds striking so hard that they are killed outright and fall dead on the balcony, then they would be secured next morning when the lightkeeper went out to inspect the lantern, its framework, and riggings. Moreover, the rap at the window made by birds striking hard would arrest attention, and induce the keeper on watch to go out on the balcony at once, and collect, at all events, some of the birds before he grew tired of this diversion. A case in point has recently come to hand, when, in the space of about two hours, about seventy Blackbirds struck so hard that they were discovered on the balcony dead. The greater number of these were packed and consigned to me by Mr. Power, Tuskar lightkeeper, to whom I am greatly indebted for the material for research purposes.

In regard to reported occurrences, it may be remembered that I have already referred to the fact that it is important for ornithologists to sift statements with a considerable degree of caution. Even the trained ornithologist may at times make mistakes in regard to the identification of the Robin as it moves hither and thither on a marine rock-island. This is due to the fact that owing to the marked unevenness of the surface, with its innumerable crevices and projections, the bird is frequently not seen in its entirety. Hence it is that if one catches sight of a bird apparently about the same size as the Robin, and at the same time only its breast and head are visible, and if in the twinkle of an eye it disappears by dropping into a crevice, one must not conclude, because the bird displayed a reddish-coloured breast, that it was a Robin. In certain light, when a curious lurid glare seems to accentuate the colour of everything on the rock, I have more than once mistaken Wheatears, with particularly richly shaded chestnut breasts, for Robins; and the female Stonechat has been pointed out to me as a Robin. I can quite understand a lightkeeper mistaking a male Chaffinch in an exhausted condition for a Robin, especially in the spring, when the breast is very richly shaded. For much of the characteristic demeanour of the Chaffinch is masked, and instead of seeing a smart perky little finch hopping about in a dainty fashion, all the while uttering its familiar "spink" note, we see an apparently rotundly built bird, its feathers all puffed out, and at the same time we note that the white on the wing is occluded by the overlapping back-feathers. In such a condition this bird seldom utters a note, and if it were observed breast on, it might be taken for a Robin. In regard to mistaken identity, I was much interested to learn from Mr. Glanville that the Black Redstart* went by the name of the young Robin by some lightkeepers, a mistake which he frankly admitted he shared some years ago.

In regard to the migration route taken by the above birds recorded by me from the Tuskar Light-Station, I cannot, as already mentioned, offer much comment. One would naturally class them as taking one of three routes:—(*a*) As descending from more northerly latitudes east of the British Isles, and travelling in a south-westerly direction, reaching Ireland as autumn immigrants; however, on account of their plumage they do not appear to resemble the Continental form of Robin, and so I am not in favour of adopting the view that they took this route. (*b*) As cross-Channel emigrants from Scotland or England and immigrants to Ireland. In their plumage they resemble the British form of Robin, but inasmuch as the movement took place as early as mid-August and ceased in mid-September, and inasmuch as the east to west or north-east to south-west inter-British movement is usually regarded as being correlated with seeking a more genial climate in cold winter weather, I am not inclined to favour the view that this was the route taken either. (*c*) As *emigrants** from Ireland seeking more southerly quarters than the British Isles, and travelling in companionship with the south-bound emigrants which accompanied them to the lantern. It is most likely that this was the route they were taking, but how far they might have flown, had they escaped all vicissitudes *en route*, I am not prepared to say.

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* Probably the adult female and immature of either sex of the Common Redstart were thought also to be young Robins.

Post-mortem examination showed that they were all immature females; all in plump condition, with much fat under the skin; and all, save one, had not a vestige of food in the gizzard. The one whose gizzard contained sparse remains of marine crustaceans was the one collected on the rock at 9.30 a.m. on September 14th, 1912. This food, foreign to the Robin's taste when on land, was no doubt picked up on the rock on the same morning that the bird arrived.

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* According to Saunders (Man. Brit. Birds, 2nd edit., 1899, p. 37) young Robins are, to some extent, driven away by their parents and forced to *emigrate*.

SOME FISH-NOTES FROM GREAT YARMOUTH AND NEIGHBOURHOOD FOR 1912.

By Arthur H. Patterson.

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The year 1912 has not provided me with any surprises in the shape of unrecorded species in my own neighbourhood, or exceptional captures, although a few erratic occurrences are worthy of note. Owing to the disagreeable weather characterizing what should have been the busiest period of the local shrimpers' season, I received very few "curios" from these inshore fisher-folk, who, on the whole, made fairly remunerative catches, the "Pink Shrimp" (Æsop's Prawn) having swarmed in the roadstead.

Since the publication of my "List of Suffolk Fishes" (*cf.* 'Zoologist,' 1909),* there has appeared a section on the "Fishes" in the 'Victorian History of Suffolk,' compiled by Mr. J. T. Cunningham, M.A. To the value of that section I would like to bear testimony. Entirely void of technicalities, it is most excellently arranged; and it is curious to note that, written contemporaneously with my own—I have not the slightest doubt that we wrote unknown to each other—the lists should so strikingly correspond. Since my own list was published, the Jago's Gold-sinny (*Ctenolabrus rupestris*) (1910), the Black Sea-bream (*Cantharus lineatus*), and the Hag-fish (*Myxine glutinosa*) have been recorded for the Suffolk seaboard; whilst Mr. Cunningham's records of the Solenette (*Solea lutea*), Cuckoo Wrasse (*Labrus mixtus*), and the Smooth-hound (*Mustelus vulgaris*) must be added to my own list. For some of the species placed in the Victorian list, to which the editor attaches a slight doubt, verification of their occurrence will be seen in my catalogue of 1909, *e.g.* the *Bubalis*, *Liparis*, Butterfish, Carps, &c.

My first fish of the year was a small Ballan Wrasse, which reached me from Lowestoft on January 5th.

On January 6th the 'Angler's News' recorded the capture of a fine Bream (*Abramis brama*) near Norwich, that turned the scale at 7½ lb., measuring 25 in. in length.

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* Pp. 361, 414 and 447.

Whilst incapacitated by influenza on February 6th, news was brought me regarding an enormous Eel (*Anguilla vulgaris*) that had been brought into port, and purchased by Mr. Robert Beazor, fish merchant. This gentleman kindly obliged me by sending the great slimy brute to my house. I had no hesitation in deciding it to be an old, undoubtedly barren, female. It looked as unsavoury as a long-kept Wolf-fish, the skin being jelly-like to the touch, while the blue-filmed eyes were as large as sixpences and lack-lustreless as ground-glass. I guessed its length at 5 ft., and was informed its weight was 28 lb.

A very young 2½ in. Black Sea-bream (*Cantharus lineatus*) was sent me by Mr. F. C. Cook on February 10th; it had been washed up on Lowestoft beach, and is new to the Suffolk list.

A "double" Flounder was captured at Breydon on February 18th. A somewhat remarkable number of Flounders, whose under sides are blotched with grey, amber, and brown, and amounting in some cases to an almost entire discoloration, are caught in the "drains" and "runs" and on the mud-flats. Dr. Günther refers to "the coloration of many marine fishes being dependent on the nature of their surroundings," and to the fact of these colours being produced in two ways, "either by an increase or decrease of the black, red, and yellow pigment cells or chromatophores, in the skin of the fish; or the rapid contraction or expansion of the chromatophores which happen to be developed." I take it that the strong chemical forces more abounding in sewer-polluted estuaries, like Breydon, intensify the tendency to discoloration by excessive irritation of the pigment cells. The Flounders taken on Breydon are always dull-coloured on the upper surface, corresponding greatly with the muddy bottom, whereas those netted outside the harbour are invariably of a bright sandy hue, and the under surface is not nearly so often found discoloured.

A 9½ in. Lemon Sole (*Solea lascaris*) was sent me from Lowestoft early in April. The general tint was sandy or light drab, with a suggestion of black dots "peppered" over it, with a number of pearl white spots, an eighth of an inch in diameter, as if implanted by the end of a penholder.

On April 7th a local shrimper brought me a very beautiful specimen of the Gattorugine (*Blennius gattorugine*), which he had captured early that day in his net when shrimping near the St. Nicholas' lightship. It measured 5 in. in length, and was only the second I have known to be captured off the Norfolk coast, the first having been brought to me in May, 1899. The present example must have been very beautiful in appearance when freshly taken out of the water, as its colours when brought to me in the evening were still strikingly distinct, red predominating, the dark bars becoming more strongly defined as the other parts faded. The upper illustration in plate cxiii. in Couch's 'Fishes,' vol. ii., is a good one of this species.

An interesting Sole came to me from Lowestoft on May 3rd; its upper surface was milk-white, with the exception of a small shilling-sized spot of the normal colour over one eye, and surrounding it. Length 15 in.

The finding of several dead Mackerel last autumn upon the tide-mark (*cf.* 'Zoologist,' 1912, p. 32) of exceeding full rotundity as compared with others of lesser girth of the same length led me to examine others washed up this year. I see nothing sufficiently suggestive as to their being of different races, but rather an individual tendency to obesity. I measured an example on October 17th, 1912, at 15 in. in length with a girth of 8 in. I made the following measurements at various dates:—

Example	14	in.	long,	6½	in.	round.	May 31st.
,,	14	,,	,,	6½	,,	,,	June 1st.
,,	13½	,,	,,	6¼	,,	,,	
,,	13	,,	,,	6	,,	,,	
,,	13	,,	,,	6	,,	,,	June 12th.
,,	12	,,	,,	5½	,,	,,	
,,	13½	,,	,,	6	,,	,,	June 13th.
,,	13½	,,	,,	6¼	,,	,,	
,,	13½	,,	,,	6½	,,	,,	
,,	14	,,	,,	6	,,	,,	June 17th.
,,	14	,,	,,	6½	,,	,,	
,,	13½	,,	,,	7	,,	,,	
,,	15	,,	,,	8	,,	,,	Oct. 17th.

I offered a somewhat tempting price to a number of fisherfolk for the first or every Mackerel they might bring me showing spots or rings upon the abdomen. There came to me in June an example with faint spots and ocellations well down below the lateral line—two-thirds down the fish; but the under part was normal. Its excess of markings made it somewhat conspicuous. I had hoped, sooner or later, to meet with a Spanish Mackerel (*Scomber colias*). Another example, measuring 16 in., with a girth of 8 in., was brought to me on Nov. 9th with very similar markings—a sort of faint fretwork of jumbled ocellations, but the absence of a swim-bladder and every other characteristic of the type (*S. scomber*) made its identification satisfactory. It would be curious to add that this, like a number of other "curios," as they term them, caused their possessors to reach me in a somewhat unintelligible and highly laudatory manner, having on their way exhibited them at every familiar public-house, a trick conducive to free drinks from an admiring or interested circle.

At the latter part of the Mackerel fishing there appeared to be a decided immigration of Dog-fishes; so numerous must they have been that great numbers of the Mackerel were taken out of the nets with their backs badly bitten; others had their bellies bitten through, their sexual organs (roes and milts) and entrails having been entirely drawn out. These "broken" fish, often fine ones, were sold to hawkers, who very readily disposed of them amongst the poor. The fisher-folk had a mild revenge in skinning the netted Dog-fishes, whose trimmed carcases were sold from the same barrows on which were exposed their victims.

Early in June Herrings taken off the coast were in fine condition and noticeably fat, some were exceedingly large. I have note of an example measuring 15 in., with a girth of 7¾ in., weighing 14 oz. A full normal Herring measured on Nov. 8th 10½ in. by 5½ in.

It is very unusual to find a Dab (*Pleuronectes limanda*) discoloured on the under surface; I obtained one, however, in the third week in June, an 11 in. example, coloured on both sides, with the exception of the under "face" or reverse side of the head. Another came to hand, about the same size, with five red spots on each side of the upper surface near the margins of the dorsal and anal fins.

A Monk-fish (*Squatina vulgaris*), 13 in. in length, was captured in a shrimp-net on July 13th. Subsequently other and larger examples came to port, probably from the neighbourhood of Cromer Knowle. On Aug. 14th I saw one on Mr. Beazor's fish-slab, weighing four stone.

At Aldeburgh two Bass scaling 13 lb., and a Grey Mullet of 6 lb., were taken, and recorded in the 'Angler's News' of July 20th.

In the following week's issue a very fine Sting Ray (*Raia pastinaca*) was chronicled; it had been taken in a trawl-net off the Sizewell Bank, near Southwold, on the 20th. The fish scaled 60 lb., and had a double barb to the tail. It had made itself extremely disagreeable to the Soles that had been unfortunate enough to be netted with it.

I commenced my August holidays by a foray among the local ditches in search of Sticklebacks, with a view to determining the several varieties I had hoped to find in the neighbourhood. My captures were mostly very small—half-grown fishes, an adult being very exceptional. It seemed to me just possible, seeing the enormous number one meets with in spring, that after the duties of procreation have ended, there must be some obscure forces at work to eliminate many of these elders. Do they die and become the food for the many carnivorous larvæ and crustaceans, &c., that frequent the same ditches? One seldom finds dead fish at or near the surface, although in July, 1909, I discovered dead Sticklebacks partly eaten by crustaceans. They were the variety known as *Gasterosteus trachurus* (the Rough-tailed). With the exception of Ten-spined Sticklebacks, on this occasion I only met with the Quarter Armed (*G. gymnurus*), both on the marshes north of Yarmouth and to the southward.

In the shallow and rather fetid ditches bordering on the River Bure I met with numerous half-grown Sticklebacks woefully smothered with black spots and blotches immediately under the skin. I take it to be the *Trichodina pediculus*, referred to by Dr. Day in his article on the *Gasterosteidæ* ('British Fishes,' vol. i. p. 243), an evidently parasitic Infusoria. I notice that the shallower and warmer—and consequently dirtier—the waters haunted by Sticklebacks, the more susceptible do they seem to attacks from parasitic visitors, and from tumours. In the same net in which I garnered the Sticklebacks I secured some peculiar coral-like Polyzoa. Mr. H. E. Hurrell, a well-known student of pond-life, who was "fishing" with me at the time, identified the specimens as marine Polyzoa, *Membrianfora monostachys* (var. *forsana*). This was attached to the lower portion of a plant which grows rankly in the brackish ditches bordering on the River Bure and Breydon walls. "It is a beautiful species," Mr. Hurrell wrote me later, "and on account of the conditions under which they were growing formed their colonies in lines of two and three cells abreast. In some cases the polypidoms intertwined, and the animals when axcerted gave the appearance of a living *chevaux de frise*. This polyzoon is closely allied to the sea-mats, and is somewhat rare, but has been found intermittently in the vicinity of Great Yarmouth for the past forty years. It is no doubt a pretty constant species, but has lacked observers." From one of these ditches, a few years since I obtained Sticklebacks infested with *Thersites gasterosteus*, a parasite which I believe to be by no means common in any other part of this country.

One of my most enjoyable excursions "happened" on Aug. 2nd, when, in company with two kindred souls, the marsh ditches lying over to the westward of the Waveney, beyond Burgh Castle, were "lamb-netted." A lamb-net is very like a quarter section of an orange, a flat base lying on the ditch bottom, the other part of the net being hooped at half a right angle. There is a sloping flange below, so that any eels that may be frightened in are prevented getting out again, as they never think to lift their heads, but viciously poke into the sloping wall of net, which is but a few inches deep. One holds the net firm by means of a long pole that is looped on to the "beam" below. The hardest work mostly fell to myself—that of "plounsing" or beating the water by a quick and forceful plunge of the end on which a sphere of wood is fastened. Advancing and "plounsing" sadly disturb the half-dormant Eels, and, fleeing before it, into the net they go. Whoever held the net could feel the contact, and would constantly shout, "Here's another!" "There's a big one in!" &c. We captured most of our Eels near the sluice-ends of the ditches which abutted on the river, the "sluice-gates" being opened as water needs to be let out, or when a drought obtains, to be let in, in order to refreshen the marshes. It is by the sluices that Eels find their way in. [illegible]t of our Eels ran from a half-pound to a pound each, and they were of a ruddy or golden hue, owing no doubt to environmental causes. We obtained over a stone, but deemed it a poor half-day's work. Among the catches we discovered a Smelt, some very small Sticklebacks, and a number of Opossum Shrimps; also one Flounder and a Perch. The paucity of smaller creatures undoubtedly was due to the hungry Eels, whose patience must sorely have been tried in filling up their stomachs with such tiny prey. In the stomachs of what Eels I dissected I only found in each a spoonful of *Gammarus* (probably *G. daubenii*), an ally of the freshwater Shrimp. The Perch was about four ounces in weight, in splendid condition, and had the stripings curiously bifurcated.

I made very few excursions after that date, for the month provided but one long series of disagreeable weather characterized by almost incessant rains or winds. Only one day did I really enjoy a little sport on Breydon, when Jary, the bird-watcher (employed by the Breydon Protection Society), roused me up early in the morning, and got his smelt-boat ready for a "draw" or two. He rowed up one of the wide "drains," and, having been put ashore encased in heavy boots, I took the "lead" line, and slowly squelched through the soft ooze as he payed out the smelt-net, and rowed down-stream with it. At four convenient points we pulled in the semi-circling net, and in four hauls had three hundred and twenty Smelts in our box under the boat's thwarts. Our catch would have been much heavier had not tide and wind proved too strong for us to manipulate the net longer. Some extraordinary hauls have been made during the autumn, bad weather notwithstanding. The utter absence was noticed of Atherines (*Atherina presbyter*), locally known as "Smolts," a fish in no request locally, being thought dry and insipid. The smelters have a saying, "If you get a lot of Smolts, you get few Smelts," and there may be something in the idea that these strongly scented fishes drive other species out of their neighbourhood. On a visit to Lowestoft I was astonished to note their almost entire absence there, as in most seasons the scores of contented anglers of all ages, baiting with the tiniest morsels of Shrimp, haul out considerable quantities of Atherines, as well as numerous young Herrings no larger than "whitebait." They, however, caught numbers of four-inch Bibs (*Gadus luscus*). Bibs of the same size were abundantly taken in the Yarmouth shrimp-nets all summer and autumn. There were unprecedented numbers of small Bass, locally known as "Sea Perch," taken on Breydon in August and September. In August they measured 4½ in.; some taken in October I measured at 7½ in., an evident quick growth of three inches in three months.

On Aug. 16th a photographic illustration of a Sunfish (*Orthagoriscus mola*), recently captured at East Runton, was published in the 'Eastern Daily Press.' It measured 20 in. from nose to tail, and 30 in. from tip of dorsal fin to tip of anal fin. From what I can gather, it was subsequently cut up for crab-bait.

On Sept. 1st, at the entrance of Wroxham Broad, some thirty miles up river, a Flounder was taken on a leger, the bait being a worm.

"Sept. 20th. The rivers during the past two or three days had been full of fresh brown water, pumped from the overflowed marshes; Bream and Roach taken in smelt-nets, and seen well towards the harbour-mouth" (excerpt from note-book).

So enormous was the downpour of back waters, after the cloud-burst, that for days, on the strong ebbs, the freshets pushed out of the harbour right away into the roadstead, going out at the Corton Gat (half-way to Lowestoft), being deflected when the returning flood-tide from the northward set in. For two or three days I suspected that no salt water came into the harbour from the sea, a fortunate circumstance for the marshmen.

Several Sea-Trout (*Salmo trutta*) were netted on Breydon during the autumn, and one was recorded in the 'Angler's News' of Sept. 21st as having been taken with gentles at Oulton Broad.

Sharks, little and big, of divers species, seem to have been very troublesome on the Herring-grounds all the way from Scotland downwards. Two nine-feet Porbeagles were brought into port in the middle of October, having been entangled in the Herring-nets.

The spring and early summer Mackerel fishery was pursued by thirty boats, the season beginning on April 15th and ending on July 8th, securing catches of over two million and a quarter Mackerel.

During the third week in September an emphatically fine Silver Bream (*Abramis blicca*), weighing 2½ lb.. was taken in the Waveney near Beccles. A fish of this species weighing a pound is esteemed a fairly good specimen.

October 6th. Among the refuse at the tide-line, and in company with many dead Herrings and Mackerel, I found a small Haddock, a rather rare visitor to the Yarmouth seaboard nowadays.

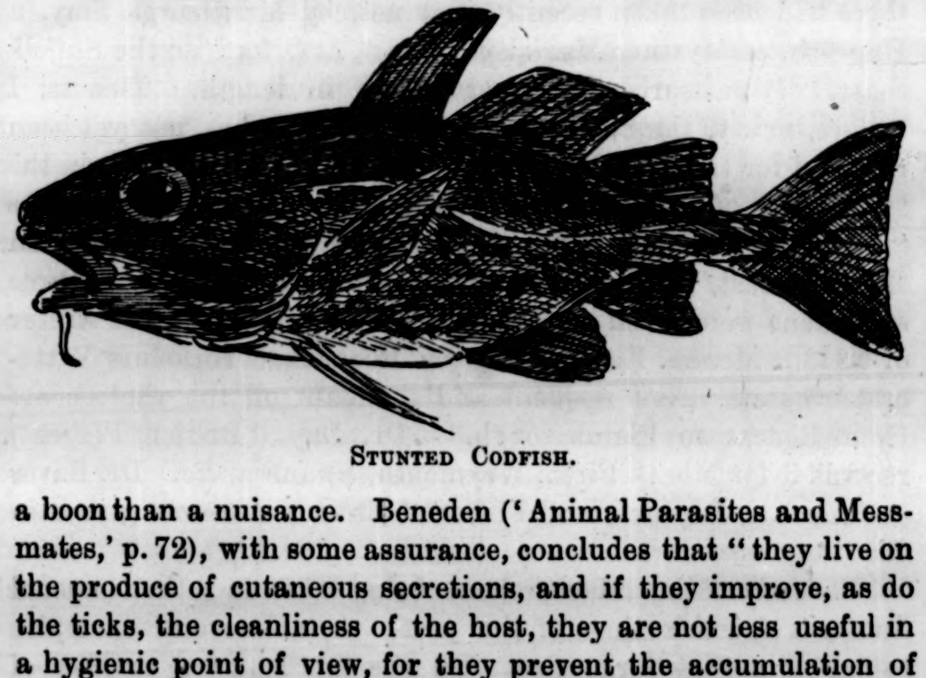
According to the 'East Anglian Daily Times' of Oct. 25th, there had been taken recently in a net, by Mr. George Smy, a Hag-fish, or Myxine (*Myxine glutinosa*), at Orford, on the Suffolk coast. It measured just over a foot in length. This is, I believe, new to the Suffolk coast, and hitherto has not yet been recorded for the Norfolk seaboard. It is given by Howse, in the 'Catalogue of the Fishes of Northumberland and Durham,' as "not uncommon," and he mentions its "extreme abundance on the east coast." He relates that one hundred and twenty-three specimens were taken out of one Codfish at Redcar in the winter of 1843. Messrs. Eagle Clarke & Roebuck ('Yorkshire Vertebrates') state it is "resident and abundant off the whole coast from Redcar to Flamborough." Dr. Day ('British Fishes') records it for Moray Firth, Weymouth, Swansea, &c. Dr. Laver ('Mammals, Reptiles, and Fishes of Essex') does not give it in his list.

November 8th. Mackerel are being taken in rather unusual numbers for this time of the year. I saw several examples to-day of a very large size. On the 9th I saw a number of Mackerel on the fish-wharf measuring 18 in.

On Nov. 12th I wrote to the 'Eastern Daily Press,' begging for an opportunity to see any so-called "slinky" (sickly) Codfish, caught by sea-anglers; now so numerously crowding every pier on the Norfolk and Suffolk coasts. I have heard of many of these wastrels being taken, but had not so far examined any, the "successful" angler almost in every case having thrown the "lice"-haunted creatures overboard again in disgust. My letter aroused considerable interest, and the first, taken on Britannia

Pier, on Nov. 15th, was sent me. It was a stunted fish, measuring 13 in. in length, with a girth of 9½ in. Upon it I found small colonies of a fiddle-shaped crustaceous parasite, which I took to be a *Caligus*. I sent some to the British Museum, where the species was identified as *Caligus curtus*.

There were as many females on this fish as males; these were still alive on the following day. It would be interesting to come to some satisfactory conclusion as to whether the parasites preferably attach themselves to an already sickly fish, or whether the poor condition follows on their attachment. The fish examined had an excess of mucous juices upon its body, upon which its lodgers apparently subsisted; in such a case they might be more of a boon than a nuisance. Beneden ('Animal Parasites and Messmates,' p. 72), with some assurance, concludes that "they live on the produce of cutaneous secretions, and if they improve, as do the ticks, the cleanliness of the host, they are not less useful in a hygienic point of view, for they prevent the accumulation of cutaneous productions." To my mind these "fish-lice" are far more pretty than their vulgar nickname. In the gills of this codling I found an obese *Lernea branchialis*, and in the stomach a number of thread-like worms. The latter, when dropped in a tube of formalin, formed themselves into a kind of ball, with many loose ends twirling and twisting in a curious manner. Altogether, I suspect this poor codling had had a shocking time!



STUNTED CODFISH.

A very large Flounder was taken about the same time, crowded with parasites, and was so thin that when held up to the light it was semi-transparent. Unfortunately I did not see this fish.

Early in December my attention was called to a long, attenuated, sickly-looking Cod, which should have weighed, if in good condition, about 25 lb. Every fin, from the pectorals to the caudal fin, was worn or eaten away—in some to half the length of the fin-rays, in others a little less—whilst through the raw edge of the dorsals the fin-rays showed distinctly. The fish had the appearance of having had the fins rotting away.

Mr. E. Curtis, writing from Lowestoft on Nov. 13th, mentions the taking of great quantities of young Soles in July among the Shrimps, a mistake that does not occur off the Yarmouth seaboard. He notes the hanging of Monk-fish from the sterns of incoming trawlers by a piece of rope, as a sort of mascot. Large numbers of Five-bearded Rocklings (*Motella mustela*) were taken in the shrimp-nets in August. On October 4th he observed a Salmon-Trout of some 20 in. length on board a herring-drifter, and on the day following a fine Sea-Bream, 14 in. in length—a rather unusual East Coast capture at this time of the year.

The great East Coast Herring Fishery, of which Yarmouth is the great centre, opened early, and excellent catches marked the beginning of the season. Up to Oct. 24th scarcely a night's cessation through bad weather had been experienced. The official figures published weekly in the local papers were of great interest, although not brightened by much "incident." The following are examples of such reports:

	Crans.
Number of crans landed at the fish-wharf for week ending Saturday, Oct. 12th, 1912	103,809
Ditto, Gorleston	15,259
Ditto, other wharves	827
Combined total for week	119,895
Total landings for the corresponding week of last year	75,560
The progressive total landings for the season up to and including Saturday Oct. 12th, are as follows:—	
Fish-wharf	262,730
Gorleston	31,576
Other wharves	1,184
Combined total landings up to and including Saturday, Oct. 12th	295,490

An increase up to corresponding date of last year of 164,750 crans.

The total of boats fishing out of Yarmouth port for 1912 was 915 as against 882 of the previous year. The following are a few interesting items connected with the fishing :—

On Sept. 24th the steam drifter 'Sunbeam' made a remarkable catch of 320,000 Herrings. The nets had been "struck" by a heavy shoal. In the early morning the crew were seen by those on other vessels to be hauling in an unusual number of fish, some of the lighter fished boats standing by with the hope of taking over such nets as could not be emptied on board the 'Sunbeam.' The skipper paid no heed to them, hoping that another vessel belonging to the same owner might come to his help, a desire that did not prove futile. A second boat came to help, and took aboard the remainder. The night's catch realized £520. The first boat brought in 230,000 Herrings, the other the remaining 90,000.

Up to Oct. 19th Yarmouth's catch was 295,490,000 Herrings, as against 164,750,000 last year. Lowestoft's catch was 150,992,000, as against 61,892,000 last year. By breakfast-time on one day that week a Lowestoft boat had cleared out her night's catch of 60,000 Herrings; she had cleaned up and got out again, and was back once more by tea-time with another great catch of 80,000 fish.

A feature of the fishing has been the freedom with which Herrings have been "struck" in the daytime.

It has been estimated by a local fish-merchant, fully competent to form an opinion, that the pilfering of Herrings by boys and even girls, mostly after school hours, had amounted in one busy week to the astonishing value of £100.

A great hue and cry has been raised against the use of the trawl for catching Herrings in the North Sea, and strong protests have been made by Scotch and English fish-merchants, who see in its continued operations disaster looming ahead. On Oct. 19th a huge protest meeting was held in Yarmouth Town Hall, when no fewer than nine Members of Parliament, twelve mayors and provosts of towns largely interested in the fishing industry were present. This meeting was promptly followed by a deputation, headed by Mr. Arthur Fell, member for the borough, which waited upon the President of the Board of Agriculture and Fisheries, and the Vice-President of the Irish Board of

Fisheries. Striking facts were presented to their notice. It was stated that £10,000,000 was invested in Herring fishing at Yarmouth and Lowestoft, and 25,000 fishermen were concerned, while apart from the allied trades 60,000 people were engaged in it. It was incontestably proved that trawled Herrings were far inferior in quality to those taken by drift-nets; they were scaleless and went black. Huge quantities of immature fish were destroyed, and the spawn undoubtedly suffered. A case was quoted where a skipper made a catch of 1200 boxes of Herrings, of which only 150 boxes were landed; at best the small fishes were only fit for manure. International action would have to be taken or ruin would follow.

Writing me on Nov. 4th, Mr. Ernest R. Cooper, of Southwold, remarks that "the Herrings are very southerly this year, and I understand the bulk of the fishing in October has been done abreast of this town; unfortunately the Scotch curers boycotted us this year, and we have had few boats in."

The record price of £4 2s. per cran was realized in Lowestoft early in December.

There was an early inshoring of very fine Sprats off Southwold, the first catches being made in October, "when," writes Mr. Ernest R. Cooper, "a school set in from the north and between 20th and 25th October, when 646 bushels were landed in the harbour. Unfortunately the weather broke then, blowing strongly from the south-west for several days, then from the north-west, and not a bushel has been caught since. [Dated Nov. 4th.] I trust, however, that another school will set in from the south as usual this month." Mr. Cooper gives the first arrivals in 1910 and 1911 on Nov. 2nd and Nov. 13th respectively. I saw no more on sale in Yarmouth until Nov. 11th, when a few turned up, on which date also broke upon us a gale from the westward, veering to the north, which put a stop at once to all sea-fishing operations, when the Scotch and English fishing luggers were packed in Yarmouth Harbour like matches in a box. Under date of Dec. 10th, Mr. Cooper writes that "the quantity of Sprats landed at Southwold Harbour in Nov. 1912 was 533 bushels against 64 bushels in Nov. 1911. More are landed on the beach; probably the harbour catch is about one-third the total landings at Southwold." To the middle of December good quantities were still being sent to Yarmouth, the long-continued westerly and south-westerly winds being favourable to fishing. The Sprats that I have sampled have been this year of exquisite flavour, an opinion not shared by Mr. Robert Beazor (*vide* "Notes").

Mr. Robert Beazor, Senr., fish-merchant, as usual, sends me some interesting "Notes." He writes:—"On Jan. 1st (New Year's Day) a half-dozen fine Smelts, full of roe, were sent to the market with some flat fish captured in a draw-net [seine], and for several days following others were landed. It was earlier than I ever knew them to be taken. Plenty of Dutch Smelts were daily on the market, prices being exceptionally low—from 6d. to 9d. per score, in boxes of two score fishes. On the whole the Smelt season was a poor one; the thirty or forty boats engaged did not average more than four or five score fishes each per tide. The largest quantity I had in one day was about fifty score. The Trout season was practically a failure; the smelters proper took but very few. In May, on three or four days, a nice lot, however, came in from Winterton and other seaside villages adjoining. On June 19th I recorded the landing of a 12-lb. Salmon by one of the drifters that had gone out for Mackerel. It had fouled and rolled itself up in the net, and was captured eighteen miles east of Yarmouth. This has been an exceptional year for Mackerel, which were landed in large quantities. Early in June Horse-Mackerel [Scads] were taken in large quantities with the Mackerel, but there was no sale for this fish, not even with the barrow-hawkers, who find no difficulty in disposing of the less tempting Dogfish! I noticed several Scribbled Mackerel and one black-backed Mackerel during the season. In September a man brought to my office a fine specimen of the Anchovy that had been enmeshed with the Herrings some three miles east of Corton Light-vessel. It was as large as a middle-sized Herring. The great Herring fishery needs no comment from me, but I must remark on the miserably poor quality of the fish, accounting for so many merchants being without their customary quantity of 'Reds' ['high-dried'], of which there are even now but few to be obtained. The Sprat season has not, to my mind, been one of the best; the fish are very 'cliny,' and poor and mean, like the

Herrings. Among the few Herrings recently [December] landed large numbers of Pilchards—quite a third of the quantity, in fact—have been taken, which is quite an unusual occurrence."

The sport of Sea Angling has become exceedingly popular in the neighbourhood of late years, anglers of both sexes becoming more numerous every year. Whitings come into the shallow waters in considerable numbers in October and November, whilst devotees of the rod, including even boys of tender years, that thronged the old jetty at Yarmouth, fished over each other's shoulders literally two and three deep at times. Mr. Harry Tunbridge, manager of the Britannia Pier, sends me the following statistics:—" The total number of Whiting taken from this pier in October was 23,206 ; in November, 8030. Total, 31,236."

Mr. F. T. Fenton, manager of the Claremont Pier, Lowestoft, under date of Dec. 14th, writes:—" No record is kept of the numbers of fish landed, but this season has been the best for Whiting for many years past. I have known 130 to be caught in seven hours by one rod. In one week no fewer than 6000 were brought to basket. Codling up to 19½ lb. have been taken this year. Major Seymour made an interesting capture of a 2½ lb. Turbot at four o'clock one afternoon, and on the next day, at exactly the same time, he landed another of 2¾ lb. weight."

The season for Codlings commenced in December, but so far poor catches have been made, a 21 lb. being the largest landed.

Amongst the few crustaceans which came to hand that attracted more than ordinary attention may be mentioned an aged Lobster (*Homarus vulgaris*), whose shell was covered with Barnacles, *Sabellæ*, and zoophytes. The edges of the outer covering, and more especially the claw-ends, were badly worn, like an old Gnu's horns in the " Zoo," it being evident that exuviation had for some time past been a lost art.

Among the malformed pincer-claws of the Edible Crab, a speciality that has interested me for many years, may be mentioned :—

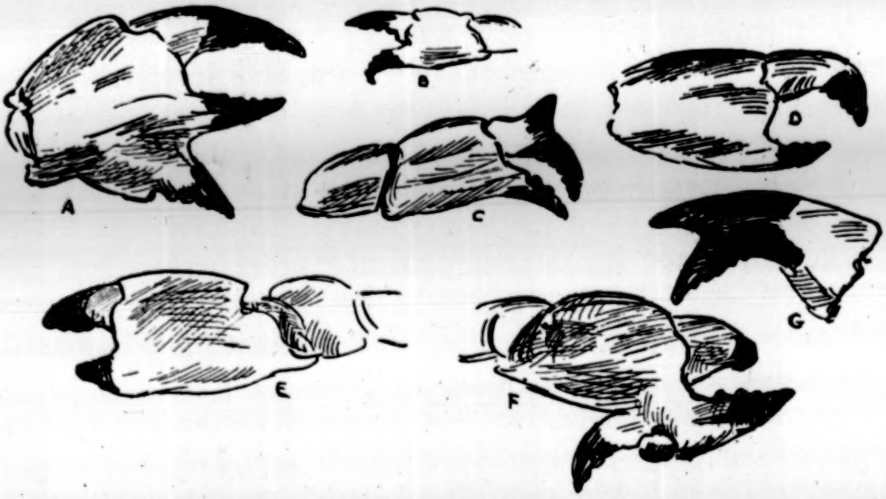
A.—A three-pointed pincer-claw that had a curious resemblance to a pickle-fork, or the fore-foot of a mole. May 6th.

B.—Small example with one chela curved outwardly.

C.—Movable chelæ with excrescence-like knob, suggesting the head of a guinea-fowl. March 23rd.

D. — When closed there was a macaw-like appearance. June 1st.

E, F.—Two pincer-claws from the same Crab: E very blunted at the points of the chelæ; F had an extra fixed chela with a small knob that easily worked in the socket, and was a bad attempt at a movable chela. The upper free chela was stunted and knobby.



G.—A large movable chela with two points.

These various specimens have been forwarded to the Kelvingrove Museum, Glasgow, where many former "finds" have been sent.

On May 31st a local fishmonger called my attention to some Lobsters that had arrived from Cromer. From out the joint behind the free chelæ a pipe-like "affair" protruded, and had sorely puzzled him as to what this might be. I immediately took hold of one and pulled it out, exhibiting to him the chelæ or claw that had been wrenched from a living Edible Crab and stuck in, not only in order to prevent the Lobster opening its pincers, but to save the trouble of tying the claws together. I had seen wooden pegs used for the purpose, and thought it extremely cruel to the unfortunate crustacean, and estimated the extra torture inflicted on the living Crab much more so, as the ligaments must necessarily have been drawn out with the "point." A crustacean casting a joint knows exactly where to do it, and suffers, I should say, little pain in the process; but this involuntary amputation was unnatural. I forwarded diagrams and account to the Hon. Mrs. Stuart, who is greatly interested in humane movements, and she concurred in my opinion. It is rather curious that the use of a wooden peg engaged the attention of the Supreme Court of Pennsylvania (U.S.A.) some little time after, when a magistrate had seen fit to decide that a Lobster was not an animal, and that there was no law against cruelty to Lobsters. Whether the Court came to the conclusion that the creature was a vegetable or a mineral (seeing that its shelly covering is composed of chalk), I have not yet learnt.

An Octopus, the body of which equalled in size a lemon, was taken in a longshore-net a few hundred yards from the shore off Yarmouth on July 9th.

Since publishing in the 'Transactions of the Norfolk and Norwich Naturalists' Society' a paper on the Whales of Norfolk, I have received the following communication from Mr. Victor Ames, of Thornham, King's Lynn:—"I don't know if a note on 'a Whale' cast up on this coast 1487–88 is known to you. I mentioned it to the late Mr. T. Southwell, after he had read his *last* paper. He thought it very interesting; he had not known of it before. I give the title at the back of my letter: 'Original Letters' during the Reign of Henry VI. Edw. IV–V. Rich III. Hy VII . . . Sir John Fenn Kt. V. Vols. Murray, Albemarle Street 1823 pp. 349–351. 'At Thornham in the King's Stream a Whale 66 feet & more. 12 feet bigness & deepness.' Mr. Southwell thought 'the King's Stream' [*i. e.* the Wash] very curious. There are a great many gate-posts here on this property of the [jaw] bones of the Whale."

As this occurrence and record may be new to some, I have thought it worthy of publication here.

THE SEALS IN THE WASH. — In his interesting Half-yearly Report on the Eastern Sea Fisheries, ending September 30th, Inspector H. Donnison again referred to the Seals (*Phoca vitulina*) which have become so prominent a feature on the sands lying in the Wash between the Norfolk and Lincolnshire coasts. He stated that rewards of five shillings per "nose" had been paid for forty-one Seals, an amount reaching to £10 5s., which did not cover all the slain, several having been lost in the sea, whilst a few living ones had been captured and despatched to various parts of the country. No continued or methodical means had been taken to abate the "nuisance," as it hardly paid for fisher-folk to neglect their various avocations of winkling, musselling, cockling, shrimping, &c., to pursue them. A higher reward was suggested. He estimated that there are now about two thousand head of Seals, a considerable increase over last year's one thousand; and he concluded that unless strenuous efforts were made to reduce them, three thousand might be expected there next year. Complaints—fisher-folk are never really content—were rife as to the havoc made among the fishes of the Wash. The large middle sands between Lynn Deeps and Boston Deeps were favourite haunts; on the Dog's Head Sand three hundred Seals were met with at one time. The young were carefully screened and protected by their parents. In this group alone the juveniles were reckoned at quite a hundred. Some young ones were captured and kept for some time on board the Fisheries boat, 'Protector,' and, although still "suckers," they were soon capable of devouring daily a bucketful of fish, which was cut up small for them. They show a preference for small flat fish, but were keen enough to accept dogfish when other food was scarce. The Inspector anticipated that next year "sportsmen" would be attracted to the spot, an eventuality that could hardly be desirable when the instincts and tender mercies of the average "sportsman" are known to be not seldom cruel. A young Seal drifted down to Yarmouth beach on the tides in September, and was easily caught by a man, who afterwards disposed of it to a menagerie.

With regard to the infant Seals, Mr. Donnison, in his Report, states that twenty-five were brought on board alive, two-thirds of which still had the umbilical cord attached to them, a proof of their exceeding juvenility; these measured from 3½ in. to 6 in. in length. The average length of these cubs was 2 ft. 6 in., and weights figured at from 24 lb. to 27 lb. A fisherman informed him that a large Seal he had taken weighed about 26 stones, and measured from tip to tip 6 ft. 6 in.; an unborn young one taken from it was 2 ft. 6 in. in length. The Inspector refers to the species generally as *Phoca vitulina*, but it would be extremely interesting if by careful examination the Grey Seal (*Halichœrus gryphus*) or any other less common local species could be identified among them.

PREHISTORIC MAN IN SUSSEX.

THE following communication was read before the Geological Society of London on December 18th, 1912*:—"On the Discovery of a Palæolithic Human Skull and Mandible in a Flint-bearing Gravel overlying the Wealden (Hastings Beds) at Piltdown, Fletching (Sussex)." By CHARLES DAWSON, F.S.A., F.G.S., and ARTHUR SMITH WOODWARD, LL.D., F.R.S., Sec. G.S. With an Appendix by Prof. G. ELLIOT SMITH, M.D., F.R.S.

The gravel in which the discovery was made occurs in a field near Piltdown Common, in the parish of Fletching (Sussex), and is described by the first author. In the section exposed it is about 4 ft. thick. It consists, for the greater part, of waterworn fragments of Wealden ironstone and sandstone, with occasional pebbles of chert, probably from the Greensand, and a considerable proportion of chalk-flints, which are also waterworn, all deeply stained with oxide of iron, and most of them tabular in shape. The human skull was originally found by workmen, broken up by them, and most of the pieces thrown away on the spot. As many fragments as possible were recovered by the authors, and half of a human mandible was also obtained by the first author from a patch of undisturbed gravel close to the place where the skull occurred. Two broken pieces of the molar of a Pliocene type of Elephant and a much-rolled cusp of a molar of *Mastodon* were also found, besides teeth of *Hippopotamus Castor*, and *Equus*, and a fragment of an antler of *Cervus elaphus*. Like the human skull and mandible, all these fossils are well mineralized with oxide of iron. Many of the waterworn iron-stained flints closely resemble the "eoliths" from the North Downs, near Ightham. Mingled with them were found a few Palæolithic implements of the characteristic Chellean type. The gravel at Piltdown rests upon a plateau 80 ft. above the River Ouse, and at a distance of less than a mile to the north of the existing stream. It appears to cover several acres, but at the same level on the opposite (south) side of the river it is represented only by scattered flints. Numerous iron-stained tabular flints, like those of the Piltdown gravel, have been found in the basin of the Ouse between the chalk escarpment and Sheffield Park, and between this escarpment and Uckfield. As they are identical with the flints well known in the plateau deposits of the North and South Downs, it may be assumed that they have been derived from a plane formerly existing between those two points.

The human skull and mandible, and the associated fossils, are described by the second author. The skull (which unfortunately lacks the bones of the face) exhibits all the essential features of the genus *Homo*, with a brain capacity of not less than 1070 c.c., but possibly a little more. It measures about 190 mm. in length from the glabella to the inion, by 150 mm. in width at the widest part of the parietal region; and the bones are remarkably thick, the average thickness of the frontals and parietals being 10 mm., while an exceptional thickness of 12 mm. is reached at one corner. The forehead is steeper than that of the Neanderthal type, with only a feeble brow-ridge, and the conformation of the occipital bone shows that the tentorium over the cerebellum is on the level of the external occipital protuberance, as in modern man. Seen from behind the skull is remarkably low and broad, and the mastoid processes are relatively small. The right mandibular ramus is nearly complete to the middle of the symphysis, lacking only the articular condyle and the upper part of the bone in advance of the molars. The horizontal ramus is slender, and, so far as preserved, resembles in shape that of a young Chimpanzee (*Anthropopithecus niger*). The lower symphysial border is not thickened and rounded, as in man, but produced into a thin inwardly curved flange, as in the apes. The ascending ramus is comparatively wide, with extensive insertions for the temporal and masseter muscles, and a very slight sigmoid notch above. Molars 1 and 2, which occur in their sockets, are typically human, though they are comparatively large and narrow, each bearing a fifth cusp. The socket of molar 3 indicates an equally large tooth, placed well within the ascending ramus of the jaw. The two molars have been worn perfectly flat by mastication, a circumstance suggesting that the canines resembled those of man in not projecting sensibly above the level of the other teeth. The weakness of the mandible, the slight prominence of the brow-ridges, the small backward extent of the origin of the temporal muscles, and the reduction of the mastoid processes suggest that the specimen belongs to a female individual, and it may be regarded as representing a hitherto unknown genus and species, for which a new name is proposed.

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* 'Abstracts of the Proceedings,' No. 932.

The authors conclude that the Piltdown gravel-bed is of the same age as the contained Chellean implements, which are not so much waterworn as most of the associated flints. The rolled fragments of molars of the Pliocene Elephant and *Mastodon* are considered to have been derived with the flints from older gravels; while the other mammalian remains and the human skull and mandible, which cannot have been transported far by water, must be assigned to the period of the deposition of the gravel-bed itself. The remoteness of that period is indicated by the subsequent deepening of the valley of the Ouse to the amount of 80 ft.

In the Appendix, Prof. Elliot Smith remarks that, although the brain presents a remarkable general similarity to the well-known cranial casts of Palæolithic man, and especially to those of Gibraltar and La Quina, which are supposed to be feminine, the cast of the skull here described is smaller and more primitive in form than any of these. The most noteworthy feature is the pronounced Gorilla-like drooping of the temporal region, due to the extreme narrowing of its posterior part, which causes a deep excavation of its under surface. This feeble development of the part of the brain which recent research has shown to be intimately related to the power of speech in modern man is very significant, especially when we notice that a marked boss (which, as Dr. Smith Woodward described, lends a curiously distinctive form to the brain-cast and skull when viewed from behind) is making its appearance in precisely the spot where in modern man is developed the mechanism that permits the spontaneous elaboration of speech and the ability to name objects.

The apparent paradox of the association of a simian jaw with a human brain is not surprising to one familiar with recent research upon the evolution of man. In the process of evolving the brain of man from the ape the superficial area of the cerebral cortex had to be tripled, and this expansion was not like the mere growth of a muscle with exercise, but the gradual building up of the most complex mechanism in existence. The growth of the brain preceded the refinement of the features and the somatic characters in general.

There are no grounds whatever for supposing that this simian jaw and human brain-cast did not belong to one and the same individual, who was probably a right-handed female.

In the discussion that ensued, Prof. Boyd Dawkins said that he agreed with the authors of the paper that the deposit containing the human remains belonged to the Pleistocene age, and that the Pliocene Mammalia in it—*Mastodon arvernensis* and the rest—had been derived from a Pliocene stratum formerly existing in that area. The latter were merely adventitious, and were no proof of the Pliocene age of the stratum. The Palæolithic implements were, in his belief, of the same age as the human bones. There was no connection between the faculty of speech and the capacity for making implements, as was urged by the last speaker. The evidence was clear that this discovery revealed a missing link between man and the higher apes, appearing at the stage of the evolution of the higher Mammalia in which it may be looked for—in the Pleistocene age. The modern type of man had no place in this age. He congratulated the Society on having had the clear and lucid statement of the authors supplemented by the valuable remarks of Prof. Elliot Smith, the highest authority on the human brain.

Mr. Clement Reid observed that no detailed "drift survey" had yet been made of this particular area, but perhaps the survey of the Sussex coastal plain might throw light on the age of the deposit at Piltdown. In the coastal plain the Pleistocene deposits fall into three main groups. At the bottom is the erratic deposit of Selsey, probably contemporaneous with the chalky boulder clay. Above comes a series of interglacial deposits showing varying climates and varying amounts of submergence, the submergence culminating in the Goodwood raised beach, at 135 ft. above the sea, and passing away in the lesser submergence shown by the raised beach of Brighton. Above all these marine and fluviomarine deposits lies the great sheet of Coombe Rock, which shows a recurrence of Arctic conditions, perhaps dry cold. The uppermost Pleistocene deposit is probably of Mousterian date.

The speaker tried to trace these deposits of the coastal plain continuously through the valleys which breach the South Downs into the Wealden area, but without much success. It seemed, however, that the low plateau of the Weald, on which the Piltdown deposit probably lies, must belong to a period later than that of maximum depression, for otherwise these lowlands of the Weald would be covered by marine deposits, as is the coastal plain. It was impossible to speak with confidence, but the whole of the evidence suggested that the Piltdown deposit and the plateau on which it rests belong to a base-level plain, which originated about the period of the Brighton raised beach. The deposits are not pre-Glacial or even early Pleistocene—they belong to an epoch long after the first cold period had passed away; but they occur at the very base of the great implement-bearing succession of Palæolithic deposits in the South-east of England.

THE PENNANT COLLECTION.

It is of interest, to zoologists especially, to know that the collections of Thomas Pennant, the author of the 'British Zoology' and other important works, have remained more or less undisturbed since the time of his death, which took place at Downing Hall, Holywell, Flintshire, on December 16th, 1798, or, at all events, although greatly disarranged, it is fortunate that they have not since been entirely dispersed. The Downing estate subsequently came into the possession of the Denbigh family, and is now to be disposed of. The present Earl of Denbigh, C.V.O., has had the whole of the Pennant collection sent to the Natural History Museum, and has very generously given permission for all specimens of interest to be retained for the National Collection.

The collection consists chiefly of stuffed birds, shells, fossils, and minerals; also a few mammals, fishes, and crustacea.

With the exception of the recent shells, the specimens have not as yet been closely investigated, so at present it is impossible to estimate their true value. Among the minerals are specimens sent to Pennant by Bishop Pontoppidam, William Borlase, and others, which may probably prove of interest.

With regard to the shells, British conchologists will be glad to know that fifteen types and sixty-one figured specimens described in the 'British Zoology' have been identified. Naturalists are much indebted to the Earl of Denbigh for this donation to the National Collection.

E. A. Smith.

NOTES AND QUERIES.

AVES.

Little Owl in North Devon.—A Little Owl (*Carine noctua*) has recently been captured at Snapper, just outside Barnstaple, in the North of Devon, and is now in the possession of Mr. Stowell, of Barnstaple. I am indebted to Mr. W. J. Harte, of the North Devon Athenæum, for informing me of this record, which is interesting because the specimen in all probability is the forerunner of an extension south-west of the species, which has recently been successfully re-introduced into this country in Hants, Yorkshire, Herts, and elsewhere. In Montagu's 'Ornithological Dictionary' (Supplement) I find, under the heading, "Little Owl":—"We are assured by Mr. Comyns that a neighbour shot at one of this species in the North of Devon in the autumn of 1808." Other specimens have been reported from Plymouth, Dawlish, Ashburton, Downes, and Pilsmore, the latter specimen being in the Torquay Museum. Another record—but still from South Devon—is given in 'British Birds' for May, 1912, p. 333.—Bruce F. Cummings (146, Holland Road, Kensington, W.).

Rough-legged Buzzard at Great Yarmouth.—On Oct. 16th, 1912, I was shown an example of a Rough-legged Buzzard (*Buteo lagopus*) which had been shot about a mile north of Yarmouth, on marshes lying between the River Bure and sandhills. The bird was feeding on the ground when first shot at, and it then rose to a considerable elevation, apparently going away. However, the gunner observed that it returned to the same spot, and by hiding himself secured the specimen. The bird appeared to be famished after crossing the North Sea, and when dissected its stomach was found to contain the remains of a frog. The bird was found to be 21 in. in measurement.—B. Dye (Row 60, Great Yarmouth).

Black-headed Gull in Full Breeding Plumage.—A Black-headed Gull, which was shot on Dec. 16th, 1912, has been brought to me, and perhaps the date may be worthy of note, as I have looked back a great many years in the volumes of 'The Zoologist' without finding an earlier date given. The bird in question is in particularly fine feather.—H. Marmaduke Langdale (Compton House, Compton, Petersfield).

Occurrence of Sabine's Snipe and Great Northern Diver in Co. Cork.—About the middle of November a specimen of that dark variety of the Common Snipe was shot near Skibbereen by a Mr. Lewis. It was the darkest specimen I have ever seen, the under parts and under tail-coverts being sooty-black.

When in the shop of Mr. Rohu, bird-preserver and furrier, on Dec. 13th, 1912, I was shown a specimen of the Great Northern Diver, exhibiting the perfect breeding plumage, which was shot the day before in Kinsale Harbour. It was one of the handsomest specimens I have ever seen; I think it a very unusual occurrence for a bird in that plumage appearing in the middle of December. In the course of many years I have shot specimens nearly every season, but except in May and June, before leaving for their northern haunts, have never met with them in the breeding plumage. Many years ago, at the end of May, when crossing Killala Bay to Killcummin Head, we met a flock of ten Great Northern Divers, of whom nine appeared to be in full breeding plumage. They had evidently collected in the Bay, preparing for their northern flight.—ROBERT WARREN (Ardnaree, Monkstown, Co. Cork).

CRUSTACEA.

Dromia vulgaris off the Essex Coast.—It has not been my privilege to see any published lists of the Essex crustaceans, and my British authorities are somewhat antiquated. Consequently, when a few days ago a fine example of *Dromia vulgaris* was brought to me from Lowestoft by Mr. F. C. Cook from the vicinity of the 'Galloper' light-vessel, I was more than pleased to believe it a rare find, as Bell gives no records for the eastern coasts north of Whitstable Bay, on the Kentish seaboard, although recorded as more frequent in the south of England. In Skuse's 'Brit. Stalk-eyed Crustacea and Spiders' it is, however, given as found "sparingly on all our coasts, . . . plentiful in the Channel Islands," and that "the Sussex and Essex coasts are perhaps our best localities." The round, velvety ball of a carapace, with the densely hair-clad, clumsy legs drawn up under it, gives the animal a very rotund, lemon-shaped appearance. This example was taken late in December by the Lowestoft sailing-trawler, 'Giralda,' whose skipper and owner, Mr. J. Stead, much interested in curious finds, brought the Crab home, remarking on its rarity, as having for a considerable period fished in that neighbourhood, he had never met with it before.—ARTHUR H. PATTERSON (Ibis House, Yarmouth).

NOTICES OF NEW BOOKS.

The Theory of Evolution in the Light of Facts. By Karl Frank, S.J. Translated from the German by C. T. Druery, F.L.S. Kegan Paul, Trench, Trübner & Co., Ltd.

The interest and importance of this publication lie in the theological position of its author combined with the authoritative imprimatur of the great Order to which he belongs. For this book is no example of the "modernism" to which the door of the Roman Church is now "slammed, barred, and bolted," but is printed with the full licence of the still strongest and pre-eminently dialectical society of that great Communion.

The argument used is neither anti-scientific nor pro-Catholic. If we define the word "evolution" as a more or less ratiocinative process by which on scientific data we seek to unravel and understand the cosmic process, we shall not disagree with Father Frank fundamentally, though of course we cannot expect to be allowed to define a term which is used by him as the centre of his argument. His conclusions—and, we take it, also the decision of his Order—are given in the following paragraph:—"Theories of evolution will remain, since everything points to the fact that there was and is an evolution of the organic world. This evolution, however, does not express itself in quite impossible spontaneous 'leaps' from the inorganic to the organic, or from plants to animals, and also not in plan and objectless hither-and-thither variation, but in a constant maintenance of the harmony between construction and function and the external conditions of life, and in constant development of the bases, since 'bases'—and these, too, for one definite end—must exist, as the result is always in one definite direction—*viz.* the purposeful, the vitally capable." Of course, Father Frank adds the postulate, that the evolutionary tendencies are creative and not accidental.

A chapter on Adaptive Phenomena in Symbiotics (Ant guests and Termite guests) is given by Father Wasmann, and no better authority could be named, but this brings us to one of the very few clerical errors in the volume. On the title-page we read, "By P. E. Wasmann"; on the outside paper covering to the book we notice the more familiar name, "Erich Wasmann."

These pages are very useful to English students and readers by giving references to little consulted German writers on evolutionary subjects. The whole treatise by Father Frank proves—and that to the hilt—at least one fact: that an evolutionary conception, varying admittedly in direction and degree, now permeates all our logical conclusions.

A Reply to "Revised Darwinism, or Father Wasmann on Evolution, by the Rev. Simon FitzSimons." By the Rev. ERICH WASMANN, S.J. B. Herder. London: 68, Great Russell Street.

THE previous volume noticed above gave us some doubts as to its representing all branches of thought in the great Church to which the author belonged. The receipt of this polemic has satisfied us that those doubts are valid. Father FitzSimons is evidently a zealous theologian, and might have lived and practised at the era of Galileo, but his scientific views are somewhat extravagant. He expresses the opinion that "the English-speaking world had about settled down to the very sane conclusion that the theory of evolution was nothing more than a weariness to the spirit and a burden to the flesh, and that Darwinism had become an intolerable bore." But this is not his real indiscretion! His great mistake is in venturing to attack his co-religionist, Father Wasmann, S.J., and by implication his suggested heretical views on evolution. The latter's reply on scientific grounds is complete, and by its absolute vindication almost cruel. This brochure is well worth the perusal of evolutionary zoologists, and is a 'Catholic Fortnightly Review Reprint.' Father Wasmann's exposition of the evolutionary conception, based on a real study of authorities whose views on all subjects are not his own, is fair, masterly, and to the point. This polemic between two Catholic theologians on the subject of evolution is, indeed, a portent, but not an unfavourable one.

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